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(71) Applicant(s)
Xerox Corporation

(Incorporated in USA - New York)

Xerox Square, Rochester, New York 14644,
United States of America

(72) Inventor(s)
Peter L Hurricks

(74) Agent and/or Address for Service
Ian Roy Goode
Rank Xerox Limited, Patent Department,
Albion House, 55-59 New Oxford Street, LONDON,
WC1A 1BS, United Kingdom

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None

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(54) Bookbinding tape with pre-stressed heat-activatable adhesive.

(57) A bookbinding tape 6 is formed where the heat-activated adhesive 16 is prestressed relatively to the tape. When the tape is activated, the adhesive shrinks longitudinally 20 of the tape so that the tape ends are not covered by adhesive at the ends of the spine of the book after the pages are pressed on.

Apparatus to produce the tape extrudes a ribbon 22 of plastic adhesive from a nozzle 24 onto the surface of a roller 26 which carries the ribbon to a pressure roller 28 moving at a differential speed, stretching the ribbon along its axis. Refrigerated blower 30 cools the adhesive so that it sets before it can resile. The ribbon is then laminated to tape substrate 12 assisted by rollers 32 and the tape is cut to appropriate lengths.

Fig.4.

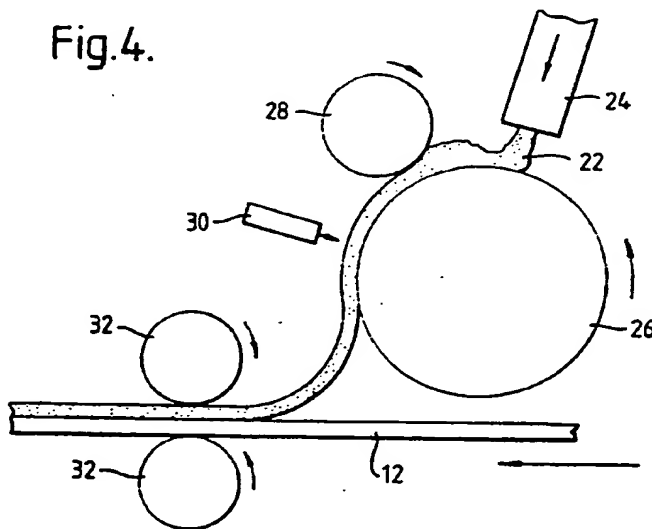
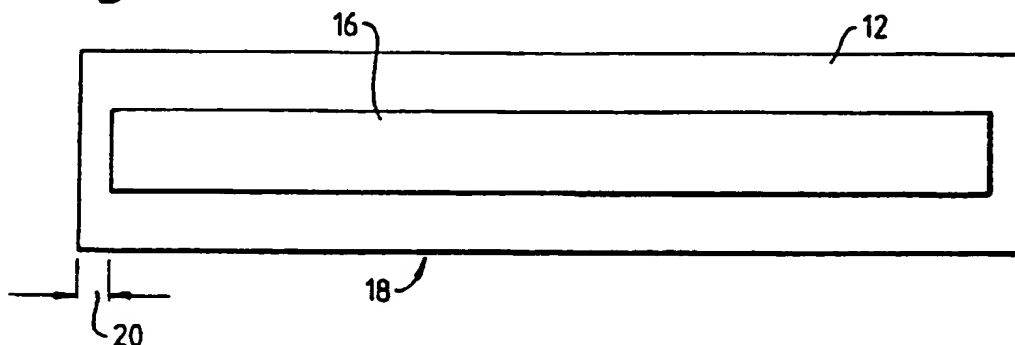


Fig.3.



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Fig.1.

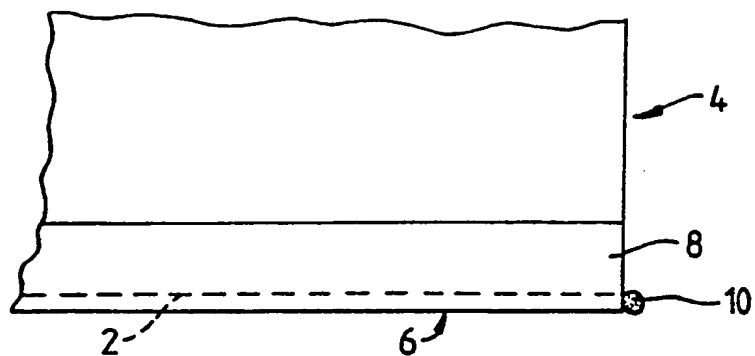


Fig.2.

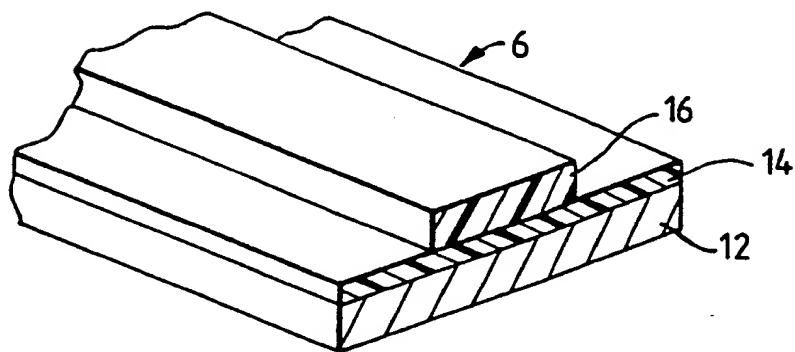


Fig.3.

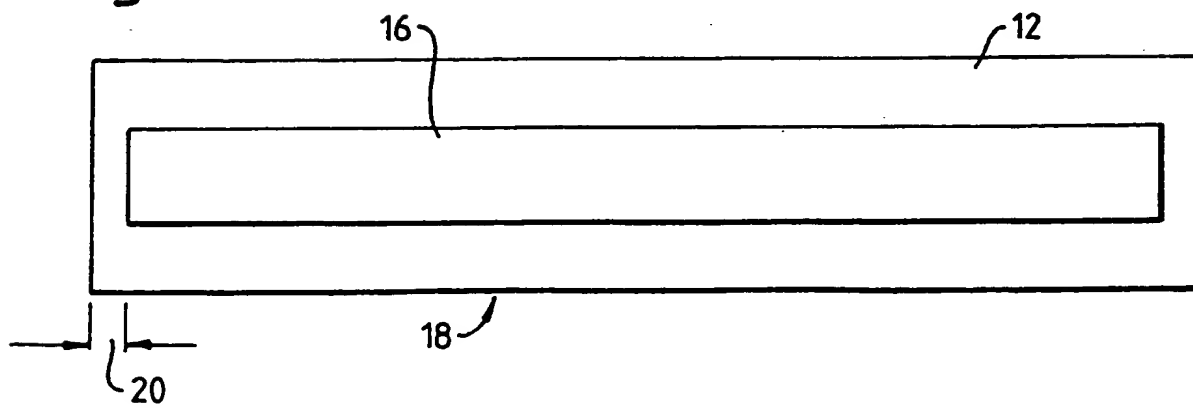


Fig.4.

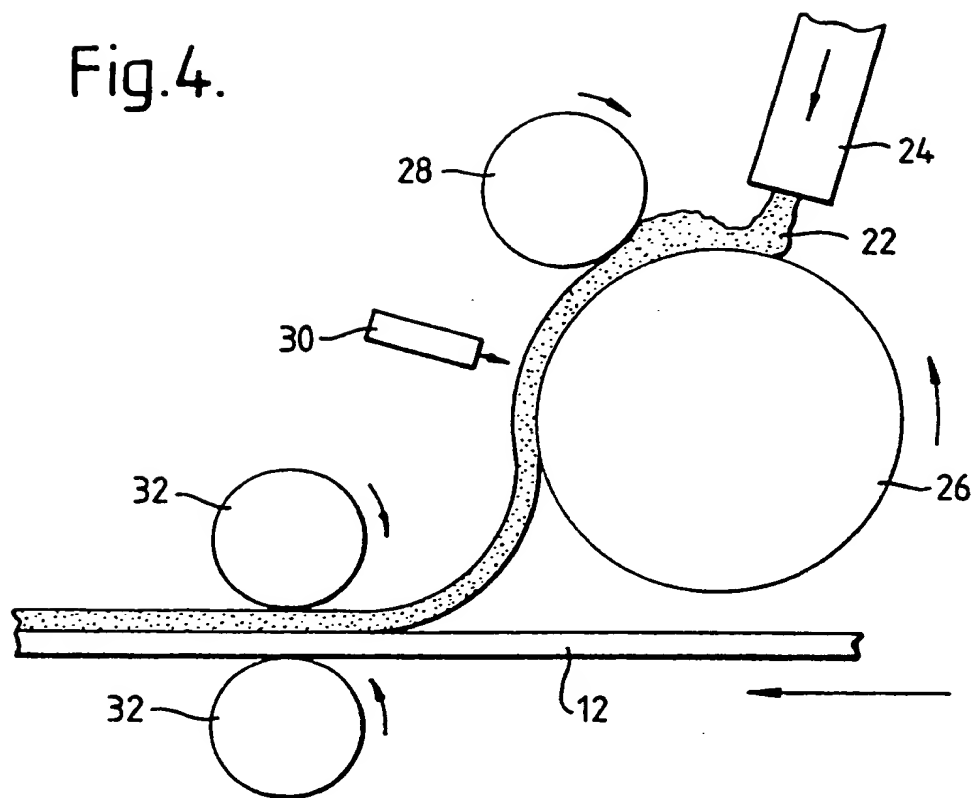
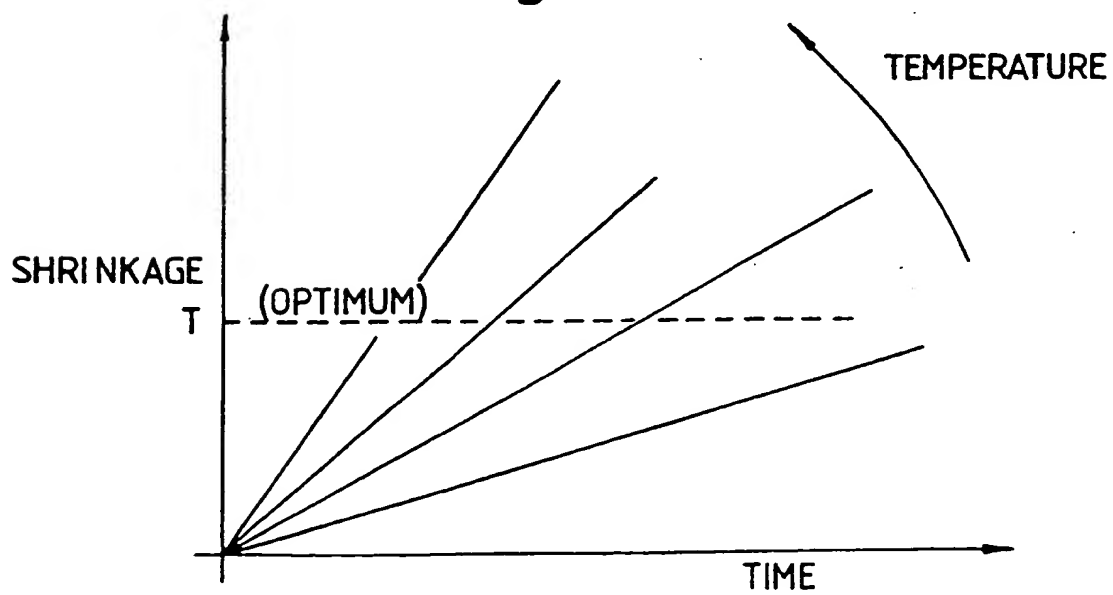


Fig.5.



BOOK BINDING

This invention relates to bookbinding, and particularly to binding a stack of sheets or signatures into a book by the use of adhesive tape applied to that side face of the stack which is to form the spine of the book.

It is known to use a tape having applied to one of its faces a narrower central stripe of a spine adhesive which is relatively viscous when activated, which is normally brought about by the application of heat. When the tape has been heated and applied under pressure to the side face, the adhesive tends to penetrate to some extent into the spaces between the sheets, and to migrate longitudinally along the tape, where it tends to form protruding bodies of adhesive, which is both unsightly and a nuisance.

The present invention aims at overcoming this problem by causing the spine adhesive to retract longitudinally from the ends of the cut tape as it is being activated, by a distance which is greater than the longitudinal movement of the adhesive under pressure, so that the extreme ends of the tape are not contacted by activated spine adhesive.

Accordingly the present invention provides apparatus for producing adhesive tape, and the tape itself, which are as claimed in the appended claims.

The present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a diagrammatic side elevation of a book bound with a known tape;

Figure 2 is a partial isometric view of one form of tape to which the present invention can be applied;

Figure 3 is a plan view of a length of tape of the present invention after it has been preheated;

Figure 4 is a schematic view of one form of apparatus of the present invention, and

Figure 5 is a diagram showing the relationship between preheating time and shrinkage for different preheat temperatures.

The book shown in Fig. 1 was obtained by contacting the bottom face 2 of the stack 4 as viewed with a tape 6 having an integral flap 8, and with a central stripe of thicker adhesive extending to the ends of the tape. After the spine adhesive had been activated by heat and applied under pressure to the face 2, the spine adhesive is fluid enough to flow to the cut ends of the tape, where it becomes extruded to form unsightly beads 10. Insofar as these beads are made of adhesive, then until they have set completely, they tend to stick to things which come into contact with them, which can lead to adhesive being transferred to bound books and other papers, thus damaging them.

The form of tape shown in Fig 2 has a basic substrate tape 12 of woven or other textile or plastics material, having the necessary strength and flexibility. Applied to one surface of the tape is a layer 14 of a flap adhesive, to which is applied a central strip 16 of a suitable spine adhesive. In an alternative construction, the two different adhesives may be applied as three separate stripes. However, the nature of the adhesives and their manner of application to the tape do not form part of the subject-matter of this invention, and so will not be discussed herein in any further detail.

In the tape of the present invention, the stripe 16 is of a prestressed adhesive. The stress is applied along the axis of the strip during its manufacture, so that when the stress is relieved the strip shortens in length. The tape 18 shown in Fig. 3 is cut from a roll or other body of indefinite length. When first cut, the ends of the strip 16 are aligned with the ends of the substrate itself. However, when the tape is heated to a temperature at which the adhesive forming the strip 16 becomes sufficiently flexible and adhesive, it is able to relax and allow the internal stresses to be relieved, which results in the strip 16 becoming shorter in length than the substrate 18, to produce two gaps 20. Depending on the nature of the material of the adhesive; the time for which the tape is heated, and the temperature to which it is raised, the gaps are preferably about two to three millimetres in length.

As shown in Fig. 4, the prestressing of the spine adhesive is achieved by cold rolling. A ribbon 22 of plastic adhesive is extruded from a nozzle 24 on to the surface of a roller 26, which carries the ribbon along to the nip between the roller 26 and a pressure roller 28. Here there is differential movement between the two rollers so that as the ribbon is solidifying it is stretched along its axis, being unable to resilie to any significant extent before it has set. This setting is facilitated by a refrigerated blower 30 blowing cold air on to the ribbon so as to cool it quickly to below its softening point. When set, it still retains sufficient flexibility to be able to be laminated to the nearer surface of the tape substrate 12, which lamination process is assisted by means of a pair of rolls 32. Although not shown in the drawings, the substrate may already have had applied to its respective surface a layer or strips of a flap adhesive

Indicated in Fig. 5 is an optimum temperature T to which the tape should be heated in order to relieve its stress sufficiently to produce gaps 20 of sufficient length to act as barriers to migration of the spine adhesive beyond the ends of the tape. Depending on the rate at which heat is supplied to the tape, then the higher the preheat temperature, the less time is needed to raise the tape to its desired temperature.

Accordingly it will be seen that the present invention provides an adhesive tape, and a method for making it, which overcomes the problem of spine adhesive migration.

CLAIMS:

1. Apparatus for producing adhesive tape, comprising means for moving a length of tape relatively to an applicator for applying to the tape a narrow ribbon of prestressed adhesive, and for bonding the adhesive to the tape in a manner which does not relieve all the stress in the tape.

2. An indefinite length of flexible tape having secured to its central axis a flexible ribbon of prestressed spine adhesive which is adapted to shrink longitudinally and differentially when the adhesive becomes activated, to leave the cut ends of a length of tape clear of the spine adhesive immediately before the tape is pressed, following activation of its adhesive, into contact with a side face of a stack of sheets to be bound together by the tape.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

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(i) UK CI (Edition L) B6A (AAA, ABB, ABC) ; B5N

(ii) Int CI (Edition 5) B32B, B42C, B42D

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Search Examiner

M J RICHARDSON

Date of Search

24 MARCH 1993

Documents considered relevant following a search in respect of claims 1-2

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

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